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ABSTRACTS OF TUBERCULOSIS

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Bone Graft in Pott's Disease.—The aim of curative measures, when an advanced destructive tuberculous process in a joint has occurred, must be the production of ankylosis of the joint. The choice of methods to attain this lies between nonoperative measures, such as the application of casts and braces, and the use of the frame and the block, and extraärticular arthrodesis of some type. Casts, because of constant normal changes in dimension of abdomen and thorax, cannot be fitted closely enough to produce complete immobility. The Bradford frame and the block have the disadvantage of protracted inactivity of the patient. The author has always been skeptical of the comparative osteogenic power of vertebral bone, and proved experimentally that transplants of ulnar bone showed marked superiority in osteogenic power. It would seem that autogenous bone transplants are necessary for higher osteogenic power, and to provide immediate immobilization of the affected vertebrae. The renewal of the blood-supply is always the first step in union, and it is reasonable to attribute the unusual success of the method, in part at least, to the linking up of the cancellous circulation in each affected vertebra with that of its neighbor and, through the graft, with that of the healthy vertebrae adjoining. The Hibbs operation probably demands a higher degree of osteogenic power than the vertebrae can be expected to supply. Since in tuberculosis this osteogenic power may be suspected of being lower than it normally is, it is probably wise to implant such bone of higher osteogenic power as is found in the tibia. The operation can be performed in as little as nine minutes, so that the danger from shock is little. The author operates on any patient at any age provided the surgical risk is good. Paraplegia and perivertebral and psoas abscess provide an additional indication for the operation. High temperature, due to secondary pyogenic infection, is a contraindication to operation, while pyrexia due solely to the tuberculosis is not. The presence of a second tuberculous focus, even if it is progressive, does not contraindicate the operation. The presence of sinuses is not a formidable obstacle. The anatomical planes of cleavage are so placed that it is rare for a cold abscess to point in the region of the spinous processes. The sinus must be sealed with a collodion tampon before the operation proceeds. The indication for operation is stronger when an abscess or sinus is present. Although this operation has been more readily accepted by the profession in adults than in children, advantage should be taken of its speed and safety to afford the child the aid to ankylosis, and to eliminate as far as possible the excessive hinge motion at the centre of the kyphosis accompanying respiratory movements, which results in a vicious circle of destruction and mobility. During the operation the spinous processes of the affected vertebrae and of two above and

two below (in the dorsal region) are split *in situ* in halves longitudinally almost down to the neural arches, with an osteotome. Care must be taken to fracture only one of each pair of spinous process halves, because of the danger of interfering too seriously with the continuity of blood-supply through the graft into the vertebral body. The gutter for the graft must be bounded by a row of fractured half-spines on one side, and unfractured half spines on the other. The single tibial graft must be long enough to cover the entire length of the gutter, and in diameter should be one-fifth that of the tibia. When the child is under 10, he is kept in bed for a minimum of from five to six weeks, according to progress. A Taylor spinal brace is applied for from 4 to 6 months or more. In cases of paraplegia the patient remains recumbent until the paraplegia disappears. Common errors in operation are the application of the graft to the wrong vertebrae, its being too high or too low, and having the graft too short to include the requisite number of healthy vertebrae or too weak to supply immobilization and resist fracture. The author reports a series of 865 cases. In only 6 per cent was the observation period less than one year, in 63 per cent it was from one to five years, and in 31 per cent of cases symptoms had been present for from 5 to 30 years or more. In only 19 per cent had the patient been complaining for less than one year. The greatest number were between 20 and 30 years of age, but almost as many were under 10. With few exceptions, the cases were those in which all other treatment had failed and the prospect was grave if not actually desperate. Preoperative complications were present in 286 cases, about half of these being abscess or sinuses. In 32 per cent there were signs of pressure on the cord. In 90 per cent of the cases the result was classified as excellent or good. In 69 cases, 8 per cent, the result was classed as fair, as the patient was restricted to light work or nothing more than exercise. Seventeen patients, or 2 per cent, died, three of them during convalescence.—*The Bone-Graft Operation for Tuberculosis of the Spine: Twenty Years Experience, F. H. Albee, J Am. M. Ass., May 10, 1930, xciv, 1467.*—(*G. L. L.*)

Pott's Disease.—The abscess associated with Pott's disease has been described as fusiform, pyramidal, or globular. The two former types represent fairly widespread dissection of the spinal column. This signifies greater resistance in the ligaments attached to the spinal column, so that there is a more widespread dissection of the vertebrae themselves. The latter type in most cases represents a less resistant set of ligaments which either break through allowing the abscess to form outside the ligamentous structure or which stretch over the area affected and prevent the dissection seen in the more resistant cases. The abscess of lumbar Pott's disease is the most serious menace to life. Its effect on the deformity is of minor importance. The thoracic abscess is a serious menace, because of its influence on the deformity, but of less danger to life itself.—*The Abscess of Pott's Disease, R. K. Ghormley, Am. J. Roentgenol. & Rad. Therapy, December, 1929, xxii, 509.*—(*W. I. W.*)

Tuberculosis of Symphysis Pubis.—Age, sex, and trauma appear to have no influence on the occurrence of tuberculosis of the symphysis pubis. The two constant symptoms are an irregular gait and a tumor mass about the symphysis or in the upper thigh. A fistula sometimes appears, which aids materially in the diagnosis. The usual treatment is surgical, such as excision or curettage and drainage. The case reported (*aet.* 23) showed a healed tuberculosis of the dorsal spine, apparently of mild degree. She had had intermittent attacks of bilateral sciatica and lower abdominal pain and signs of sacroiliac strain. Just prior to a gynaecological operation for retroversion of the uterus, an X-ray film revealed a peculiar shadow in the symphysis. Operation revealed a pelvic framework of normal appearance, and after suspension the patient was asymptomatic for 6 months when her sciatica returned, together with a limp. X-ray showed definite destruction of the symphysis pubis on the left, and operation revealed extensive bony destruction and a large cavity extending under the labia. Light curettement and a bone graft were done. The patient was in bed for 12 weeks and was gradually let up after being fitted with a corset. For more than three years she has been well. The diagnosis of tuberculosis was made in the laboratory from an examination of sequestrated bone and came as a surprise. It is recommended that in all cases of sacroiliac lesion, inguinal pain, and tenderness in the lower abdomen or upper thigh, an X-ray of the symphysis pubis should be made.—*Tuberculosis of the Symphysis Pubis, H. C. Bean, Jour. Bone & Joint Surg., April, 1930, xii, 345.*—(*H. S. W.*)

Bone-Graft for Tuberculosis of Hip.—Extraärticular arthrodesis of the hip by bone-grafts is a logical procedure, and years of experience prove that it is feasible and profitable to the patient. It is indicated:

"(1) when there is constant relapse of the adduction deformity in spite of long periods of conservative treatment; (2) if the adduction deformity recurs following Gant's osteotomy; (3) if the roentgen-ray reveals marked destruction of the head of the acetabulum or both; (4) if there are symptoms of active tuberculosis in adults or older children, even if the destruction of bone is moderate. It is also applicable in certain cases of osteoarthritis." If only moderate destruction has taken place, the trocanter and ilium cannot be brought very close together; if destruction is great, these structures approximate each other. In the first instance, bridging with bone (especially from the tibia) suffices. In the second, a sliding graft may connect the two, or the trocanter may be mortised into the ilium. A knowledge of function as well as of anatomy is necessary to the best work of this type. Details of the several stages of the procedure are given.—*Extra-articular Arthrodesis of the Hip, by Bonegraft for Tuberculosis of the Hip, F. H. Albee, Am. J. Surg., April, 1930, n.s. viii, 764.*—(*H. S. W.*)

Cauterization of Tuberculous Knee Joints.—A method of treatment is described for tuberculous lesions of the synovial membrane of the knee without bone involvement. Three incisions through the skin only are made with the cautery and the wounds are covered with hot sodium-carbonate dressings. Passive motion is commenced after ten days, active motion allowed after fourteen days, and the patient is permitted to walk in about twelve weeks. From a series of ten knees treated in this manner, there were eight complete cures.—*Treatment of Tuberculous Knees by the Cautery, A. Z. C. Cressy, Brit. M. J., May 10, 1930, no. 3618, 857.*—(*M. E. P.*)

Cauterization of Tuberculous Knee Joints.—Dr. Cressy's article on tuberculosis of the knee (May 10, p. 857) is discussed. His treatment of chronic synovitis by use of the cautery is criticized, because: (1) tuberculosis of the knee was not proved in the patients so treated; (2) ruthless attacks on the skin and subcutaneous tissue cannot completely change the histology of synovial tuberculosis; (3) active motion following the cauterization, as advocated, will harm tuberculous knee joints; and (4) the patient needs general as well as local treatment, as the lesion in the knee joint is not a primary, but a metastatic one.—*Treatment of Tuberculous Knees, G. R. Girdlestone, Brit. M. J., May 24, 1930, no. 3620, 977.*—(*M. E. P.*)

Tuberculosis of Knee and Sarcoma.—The author reports a case of origin of sarcoma at the site of a knee-joint tuberculosis occurring ten years after the treatment of the tuberculosis and originating from a fall on the knee. Amputation revealed a giant-cell sarcoma while the tuberculosis had entirely disappeared. The patient improved for a short time afterward, but several months later developed pulmonary metastases. It is not believed that there was a causal reationship between the origin of the sarcoma and the roentgen-ray treatment for the tuberculous knee-joint. It is possible that the tuberculosis may have acted as the irritating nidus for the sarcoma. The development of sarcoma in tuberculous joints usually occurs in youthful individuals and commonly in the knee-joint.—*Kniegelenktuberkulose und Sarkom, W. Jaruslawsky, Centralbl. f. Chir., 1929, lvi, 915.*—(*H. J. C.*)

Renal Tuberculosis.—A survey of surgical reports indicates that from 25 to 35 per cent of all nephrectomies are done because of renal tuberculosis. Forty per cent of these patients are not cured but continue to have persistent bladder symptoms. The following pathological types are recognized: *1:* Toxic Albuminuria: the urine containing albumin, no casts and few or no pus cells, and if ulceration occurs it may contain tubercle bacilli. *2:* Subacute and Chronic Nephritis: the urine containing albumin and casts, with pus cells and perhaps tubercle bacilli. *3:* Haemorrhagic Nephritis: the urine containing blood cells, light albuminuria and a few casts. *4:* Amyloid Degeneration: truly a glomerulonephrosis. Invasion of renal tissue with tubercle bacilli carried through the blood-stream is probably responsible for the toxic albuminuria, there frequently occurring an inflammatory reaction in the capillary tuft in the glomerulus and around the small arterioles between the tubules. If only a few bacilli are present, ulceration and discharge of bacilli may not occur, and albuminuria may be the only symptom. As a result of repeated infections, the inflammatory condition may become more extensive, and both albumin and casts will appear in the urine. This inflammatory lesion, when accompanied by ulceration into a tubule, causes most of the controversy concerning eliminatory bacilluria. The author believes that bacilluria may occur without the development of a macroscopic destructive lesion, but feels that it is always an indication that some tuberculous lesion in the kidney has progressed far enough to cause ulceration. Tubercle bacilli probably cannot pass through the kidney without producing a lesion. Since practically all renal tuberculous infections occur through the haematogenous route, the author believes that except in very rare instances both kid-

neys are primarily infected, although the majority of the bacilli may find their way into one kidney, to produce destruction there. According to Medlar, early pathological lesions may be classified anatomically as cortical (75 per cent), corticomedullary (13 per cent), and medullary (11 per cent). In cortical lesions destruction occurs infrequently. They heal more frequently than the other types and leave many microscopic scars. Corticomedullary lesions are very destructive, and may have their beginning in the arcuate arteries. They may heal, but not as often as the cortical type. Pus and bacilli are generally seen in the urine. Medullary lesions originate from the tiny vessels in the medulla in the pyramid. There is much accompanying destruction, with bacilluria and pyuria. This lesion is observed more frequently by the urologist, and constitutes 75 per cent of the clinical types of renal tuberculosis now observed. Many cases of early renal tuberculosis go undiscovered and heal before destruction occurs. Experience has taught that repeated examinations are necessary to determine the condition of both kidneys. Study of a series of cases by the author reveals that in practically every case renal tuberculosis could be considered a secondary lesion. Less than 25 per cent had severe urinary symptoms. No symptoms were present in a majority of the patients with early lesions. Some patients developed symptoms months or years after a diagnosis was made. The pyelogram is indispensable in the diagnosis of early lesions, and in the above series was the first positive localizing finding in 56 of the cases. Bilateral pyelograms should always be made. The pain that often comes after pyelography is probably not due to overdistention but to trauma caused by the ureteral catheter. The early pyelographic filling defect found with renal tuberculosis is produced by a tiny area of renal destruction and is called a cortical abscess, so tiny that it may be easily overlooked, occurring usually at the tip of a calyx. Careful study has demonstrated that bilateral lesions may occur in about 57 per cent of cases. The author believes that the tiny nondestructive haematogenous lesion may easily heal, and that the patient should have sanatorium treatment until the urine is free from pus and tubercle bacilli, and he has demonstrated his ability to heal any other lesions which may be present. When one kidney has a nondestructive lesion and the other a destructive one, the patient should be under sanatorium care until arrest of the nondestructive lesion has occurred, when the other kidney may be removed. When a patient has a destructive lesion in only one kidney and no activity in the lungs, he should have a nephrectomy. Following nephrectomy, he should have the advantage of sanatorium treatment until all evidence of activity elsewhere has disappeared. The removal of one of two kidneys, both known to contain destructive or nondestructive lesions of tuberculosis, is not good surgery, and tends to shorten the patient's life. Sanatorium treatment alone is advised in these cases. The author is much encouraged by results with bilateral lesions in which the patient has developed resistance sufficient to control them for many months, with in some cases disappearance of all symptoms except pus and bacilli in the urine. Renal lesions may in time become entirely encapsulated, with no evidence of activity elsewhere in the kidney.—*Renal Tuberculosis, G. J. Thomas, J. Am. M. Ass., January 25, 1930, xciv, 229.* —*(G. L. L.)*

Renal Tuberculosis. This paper is based upon a series of 221 cases under personal observation, with records of sufficient data to warrant their inclusion. *Frequency:* According to Wildbolz, in a series of 2,345 necropsies performed in six years in the Pathological Institute in Berne, 5.3 per cent showed renal foci, compared with 20.7 per cent of pulmonary tuberculous lesions. From a different aspect Braasch reports that during a given period, of 85,000 patients operated on, 532 operations were for renal tuberculosis, or 0.6 per cent. *Histories:* In this series of 221 cases there were 43.5 per cent in which the patients gave a history of some previous operation, and in about half these cases (47.7 per cent) it was for a tuberculous condition, especially somewhere in the genitourinary tract,—most frequently castration or epididymectomy had been done. A fair number of operations were for bone and joint lesions, also tuberculous lymph nodes. Another group of 26 cases had consulted their physicians for various urinary symptoms, for which various procedures, especially removal of the appendix (10) had been done. *Age and Sex Incidence:* The largest number of cases, 73, occurred in the third decade (20 to 29) and 56 per cent in the third and fourth decades (20 to 39). While it would appear that renal tuberculosis in infancy and childhood is uncommon, Rilliet and Barthez demonstrated renal tuberculosis in 15.7 per cent of 312 necropsies done on tuberculous children and 13 cases, or 10 per cent, were found in a series of 126 such necropsies at the Pathological Institute in Berne. As to sex, Wildbolz's series of 245 cases shows no difference, while Braasch's statistics showed 63.5 per cent of cases in males, nearly 2 to 1.

Unilaterality: Incidence of Tuberculosis Elsewhere: Kretschmer always regards the opposite kidney with suspicion until he can positively exclude the presence of a tuberculous focus there. The urinary findings from that side may be normal in the case of a focus not communicating with the pelvis. Renal-function tests will rarely detect slight lesions and pyelography is of much more value. There is, or should be, ample time for careful and if necessary repeated investigations before going ahead to operate. When there is doubt as to the presence of any tuberculous lesion, it is much better to wait several months and check up rather than remove a normal kidney. In this series the incidence of bilateral disease was just short of 20 per cent (19.3 per cent). This may be compared with Wildbolz's figures of 12 per cent, Brongersma's of 14 per cent and Braasch's of 3 per cent. There were also 14 cases in which, owing to extensive bladder involvement, the kidney responsible was not determined. Pulmonary tuberculosis, verified by clinical and roentgenographic findings checked against each other, existed in 35.5 per cent of cases. Old or healed cases did not affect the operative mortality. Among 123 males, 39 had genital tract involvement and in 26 of these with the epididymis. The best functional results are undoubtedly obtained in cases with slight or no bladder involvement. One is also justified in stating that the largest number of cases are unilateral early in the course of the disease, while later the percentage of bilateral cases is very high. The amount of impairment of bladder function is in direct ratio to the duration of the disease and likewise the persistence of bladder symptoms after operation. *Symptoms and Diagnosis:* Frequency of urination was present in 184 cases, or 83.2 per cent, and nocturia in 166. Pus was found in the urine in 201, or 90.9 per cent, and tubercle bacilli were demonstrated, either on smear or guinea-pig inoculation, in 194, or 87.7 per cent. In 27 cases the diagnosis was made without bacteriological proof, from flat X-ray films in 7 cases, and from clinical data, including cystoscopy, in 20. Positive X-ray findings were in the form of small irregular areas of calcification, occasionally in the ureter as well as the kidney. The purely clinical diagnoses were verified by operation or necropsy. Exploratory operation was done only after repeated attempts to obtain the necessary information in other ways, and in one such case revealed the presence of advanced bilateral disease. In the discussion that followed, A. L. Chute, of Boston, emphasized the fact that the most important reason for removing tuberculous kidneys is their tendency to lead to serious bladder involvement. T. N. Hepburn, of Hartford, places great stress on the appearance of the ureter and bilateral ureteropyelograms, and does not hesitate to operate, without awaiting guinea pig inoculation, which he thinks often imposes unwarranted delay. Kretschmer admits that in frankly unilateral cases, extensively involved, operation without delay may be indicated but believes many cases deserve prolonged observation and study.—*Tuberculosis of the Kidney, H. L. Kretschmer, New England Branch American Urological Association, Boston, November 5, 1929, reported in New England J. M., April 3, 1930, ccii, 660.*—(*A. P.*)

Renal Tuberculosis.—Of 221 cases of renal tuberculosis, 47.7 per cent gave a history of an operation for a tuberculous condition. The highest incidence occurred at ages 20 to 29, with very few cases in juveniles. The existence of bilateral renal tuberculosis is, of course, of the greatest possible importance when nephrectomy is contemplated. A small lesion in the contralateral kidney may be undetectable, but pyelograms will usually reveal such lesions; at least pyelography is of more value in such situations than is renal-function study. Sometimes renal tuberculosis in the early stages offers diagnostic difficulties. Suppose one or two tubercle bacilli are found in the urine from one side, shall one operate? No, at least not immediately. The course of the disease is slow and one should wait at least for the results of animal inoculation. If this results negatively, the patient should be subjected to an entirely new and complete clinical and roentgenological work-up, including the inoculation of guinea pigs with catheterized urine. About 35 per cent of 180 cases studied showed pulmonary tuberculosis. Of the entire 221 cases reported, the duration of symptoms varied from 1 to 26 years, but in nearly 70 per cent symptoms had been present for two years. Leading symptoms were frequency, nocturia, haematuria, dysuria, and pain in the back. Tubercle bacilli were present in 87.7 per cent. A good many of the remaining cases had extensive vesicular tuberculosis and could not be completely examined.—*Tuberculosis of the Kidney; a Critical Review Based on a Series of Two Hundred Twenty One Cases, H. L. Kretschmer, Am. J. Surg., August, 1930, n. s. ix, 221.*—(*H. S. W.*)

Renal Tuberculosis.—A case is reported of a tuberculous kidney in which the kidney is "replaced by a tuberculous pyonephrosis of enormous dimensions" with diffuse infil-

tration of the caseous material with lime salts. After twenty-nine years of observation of this tuberculous patient, the renal lesion seems to be completely arrested.—*A Case of Old-Standing Tuberculous Kidney, J. J. Conybeare, Brit. M. J., August 30, 1930, no. 3634, 314.*—(*M. E. P.*)

Treatment of Renal Tuberculosis with Tuberculin.—In the urological department of the New York Hospital practically all types of urological tuberculosis have been treated with tuberculin for more than three years. None so treated have had active pulmonary tuberculosis. The plan of small dosage has been followed, serial doses in small amounts being slowly increased until evidence of a local, focal or constitutional reaction occurs; then the dose is reduced, and cautiously increased until a secondary reaction occurs. The usual initial dose is 0.1 cc. of a 1:10,000,000 dilution of tuberculin. Of 14 inoperable cases, chiefly bilateral renal tuberculosis, 8 seem improved, 3 seem stationary and 3 are apparently retrogressing. Of 37 postoperative cases, 25 were nephrectomies. Of these, 21 seem improved, 3 are stationary and 1 is apparently retrogressing. Although other factors in treatment have made it difficult to evaluate the results from the use of tuberculin, the impression gained is that it has been helpful, and cannot be dismissed as not having any value, although it is evident that it is not a cure for urological tuberculosis.—*Tuberculin Therapy in Urologic Tuberculosis, S. L. Wang, J. Am. M. Ass., January 25, 1930, xciv, 235.*—(*G. L. L.*)

Pregnancy and Renal Tuberculosis.—As the result of the gravid state renal tuberculosis can develop a stormy course. The author reports 10 cases. Part of the progression is attributed to a secondary colon-bacillus infection. The therapy of renal tuberculosis following pregnancy is nephrectomy, which can be performed satisfactorily during pregnancy. Widespread tuberculosis of the bladder or nonspecific disease of the healthy kidney (pyelitis) indicates interruption of the pregnancy. Nephrectomy can be performed in spite of this also, and nephrectomized women can tolerate subsequent pregnancies. The author reports 14 women that survived 23 deliveries following nephrectomy.—*Schwangerschaft und Nierentuberkulose, H. Marx, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 625.*—(*H. J. C.*)

Tuberculosis of Vagina.—This rare disease may present the pathological appearance of ulceration, nodulation or scarring, and may require several biopsies before diagnosis is possible. The urethra is generally uninvolved. Symptoms may be general (if there is tuberculosis elsewhere in the body) or local, the latter being characterized by dull ache locally, and at times in the lumbar region, and in some cases bleeding and vulval oedema. It is most often a complication of pulmonary tuberculosis. Examination may reveal either an ulcerative or a hypertrophic reaction, especially involving the vulva. It may disclose a fistula leading to the ulcer from an area of tuberculosis in the lower gut. The lesions must be differentiated from those of gonorrhoea, senile vaginitis, trauma, prolapsus, syphilis, cancer, actinomycosis or esthiomenus. Biopsy, vaginal smears and blood examinations help in this. Carcinoma is friable, bleeds easily, invades the surrounding tissues, and metastasizes to regional lymph nodes and often grows rapidly. Treatment is unsatisfactory. Excision under local anaesthesia probably offers the most hope, but this frequently fails. The disease is chronic and usually slowly and unremittingly progressive if not operated upon, and it not infrequently recurs after operation.—*Tuberculosis of the Vaginal Tract, W. H. Barnes, Am. J. Surg., April, 1930, n. s. viii, 810.*—(*H. S. W.*)

Histology of Lupus.—As the result of an examination of 100 excisions of lupus tissue the author found that fresh foci consist of small accumulations of epithelioid cells demarcated from groups of lymphocytes, and in older lesions large numbers of epithelioid cells with disintegration and liquefaction changes and frequently without demarcating lymphocytes. Exceptions to these typical pictures exist in about 20 per cent of the cases. Giant cells are not very frequent. Plasma-cell infiltrations are rare, being more frequent peripherally than centrally. In only 2 of the 100 cases there were marked accumulations of plasma cells.—*Über wechselndes Aussehen und Menge der Zellreaktion bei Lupus und ihre Erklärung, K. A. Heiberg, Virchow's Arch, 1929, cclxxii, 375.*—(*H. J. C.*)

Treatment of Tuberculosis of Skin with Gerson's Diet.—The discussion of the value of this dietary regimen must probably be settled by observations on extrapulmonary lesions, whose progression and retrogression can be followed more closely than pulmonary foci. Thirteen patients suffering with lupus, tuberculosis of the skin, and of the mucous membrane, were treated according to the method used by Sauerbruch and Herrmannsdorfer. Nine of these patients improved definitely. In two of these

who had very advanced lesions which had resisted local treatment for years, the result of the treatment was exceedingly good. The ulcerations became covered with epithelium. The infiltrations were much resorbed. Of the 4 patients who did not benefit by the diet, three used this diet only four or five weeks. One other patient who was on the diet for thirteen weeks showed progression of his lupus. The best results were obtained in ulcerative forms. The exudative types of lupus showed definite improvement. The dry, nonelevated, squamous forms of lupus did not benefit by the treatment. A complete anatomical cure was not obtained in any case. This method is neither universally successful nor does it produce a complete immunization in the individual case. The retrogression of the lesion proceeds in the same manner as in patients who have been treated by the administration of vaccines or in patients who show spontaneous retrogression. It was ascertained by control cases that the ordinary hospital diet, rich in calories, does not produce the same results. Eight of the beneficially influenced patients were reëxamined three years after the treatment: one of them cannot be considered, because he had undergone a local operation; three showed some progression and four had remained stationary. It remains undecided which factors in the diet are responsible for the beneficial results. Nine patients received the diet, but their sodium chloride was not reduced and they did not receive any mineralogen. Six of these patients showed improvement, which however was quantitatively less than that of the fully treated patients. Patients who had been on the diet did not show any deterioration as sodium chloride was added. Whether the low sodium chloride and the addition of mineralogen played an important rôle remains undecided. This probably cannot be solved by animal experimentation, since skin tuberculosis in animals is essentially different from that observed in human beings.—*Ergebnisse der Diätbehandlung der Hauttuberkulose, P. Wichmann, Klin. Wchnschr., December 17, 1929, viii, 2366.*—(*M. P.*)

Treatment of Skin Tuberculosis—Hedry recommended the "Lupoheal" ointment for topical applications in cutaneous tuberculosis. This ointment contains 10 per cent zinc sulphate and 3 per cent sodium chloride. A total of 25 patients was treated with this ointment, 14 of whom had lupus, 5 had verrucous tuberculosis and 6 had scrofuloderma. The results, particularly in lupus, were very satisfactory; one should not rely on this treatment alone, but use it in combination with all the other forms of well established therapeutics.—*Ueber die Behandlung der Hauttuberkulose mit Lupoheal-Salbe, J. Schlammadinger, Wien. klin. Wchnschr., April 24, 1930, xliii, 530.*—(*M. P.*)

Differential Diagnosis of Miliary Tuberculosis.—A case is recorded in which the roentgenological as well as clinical findings indicated miliary tuberculosis, but tubercle bacilli had never been found in the sputum even on animal inoculation. The sputum contained numerous diplococci, however. An intercurrent effusion yielded a clear exudate with diplococci on numerous tests. The roentgenological findings disappeared within two years. It is suggested that a number of the cases of healed miliary tuberculosis reported in the literature were really processes due to the diplococcus.—*Ein Beitrag zur Differentialdiagnose der Miliartuberkulose, W. Münchbach, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 166.*—(*H. J. C.*)

Large Salivary Glands in Miliary Tuberculosis.—The literature contains but very scant references to the occurrence of miliary tubercles in the large salivary glands, that is, parotid, submaxillary, and sublingual glands. In 9 patients with miliary, and one with cavernous pulmonary tuberculosis, these organs were examined with particular care, in part in serial sections. Out of 13 submaxillary glands, six contained miliary tubercles; they came from five different patients. Only in one patient out of four was it possible to find miliary tubercles in the sublingual glands; and only in one patient out of six was the parotid involved. The total number of tubercles in the involved organs was very small. They were epithelioid tubercles, usually containing giant cells; central caseation was present in some of them. Most tubercles were found in the parenchymatous tissue and not in the interstitial tissue. In two patients, intraglandular lymph nodes showed tuberculous foci; such foci may, by lymphatic propagation, cause tuberculous lesions in the glandular tissue. Secondary changes, such as atrophy and degeneration, were absent in the involved glands.—*Über die Mitbeteiligung der grossen Mundspeicheldrüsen an der allgemeinen Miliartuberkulose, E. Kirch, Centrlbl. f. allg. Pathol. u. pathol. Anat., March 10, 1930, xlviii, 12.*—(*M. P.*)

Tuberculous Sepsis.—Under the term "tuberculous sepsis" the author includes those cases which were first described by Landouzy with a disease picture of a typhobacillosis. These cases begin like typhoid fever, with a remittent fever, enlargement

of the spleen and liver, meteorism, gastric disturbances and collapse, and in some cases obstipation and the typhoid tongue. The urine contains traces of albumin and a positive diazo, and in about 5 per cent roseola were found. There never occurred, however, a positive agglutination test. Two cases are described, and it is concluded that the diagnosis can hardly be made at the bedside, and only the postmortem findings are crucial.—*Über die Tuberkulosesepsis, N. Roth, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 634.*—(*H. J. C.*)

Tuberculous Sepsis Probably of Avian Bacillus Type.—A case of *sepsis tuberculosa gravissima* is described, in which the causative organism grew rapidly in culture, was not pathogenic for guinea pigs or mice, and is believed to belong to the avian type. A review is given of the described cases of similar infection in man.—*Über einen Fall von "Sepsis tuberculosa gravissima" (Geflügeltuberkulose?), M. Dugge, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 538.*—(*H. J. C.*)

Therapeutic Indications for Pulmonary Tuberculosis.—The author contributes to the views of Kayser-Petersen, which agree with those of Braeuning and others, that only about 7 per cent of cases of pulmonary apical tuberculosis become progressive in subsequent years. Closed apical tuberculosis is, as a rule, a benign disease, and ambulant treatment is advised without stigmatizing these patients as phthisical. The cases with genuine catarrhal symptoms are usually open, and repeated search for bacilli should be made. In spite of this, progression is not common even in these forms. With bronchogenic spread aspiration foci of a productive type may occur. Infiltrations and cavities require immediate treatment in tuberculosis hospitals or sanatoria. Monolateral infiltrations, especially of the disintegrative type, require early collapse therapy, with careful observation of the contralateral side. In bilateral infiltrations and disintegration bilateral collapse therapy takes first place.—*Die neuen Anschauungen über die Entwicklung der Lungenphthise und die Auswirkungen auf die praktische Tuberkulosebekämpfung, G. Liebermeister, Zeitschr. f. Tuberk., 1929, liii, 97.*—(*H. J. C.*)

Evaluation of Pulmonary Cases for Treatment.—Using 6 typical cases as examples the author points out the difficulties in evaluating cases of tuberculosis for treatment. In spite of exacting clinical, roentgenological and serological examinations of cases it is not always possible to determine the presence of active tuberculosis. Even widespread roentgenological findings do not absolutely indicate the activity of such processes.—*Beitrag zur Frage der Auswahl von Lungenkranken für Heilverfahren, F. Seligsohn, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 172.*—(*H. J. C.*)

Employment of Tuberculous.—A survey of schemes offering remunerative employment for tuberculosis patients is presented. Two English and four American workshops are described. The occupations provided are as follows: firewood-making, brush-making, painting, leather-goods manufacture, needlework, watch-repairing, jewelry and cabinet-making. All are being subsidized with money or labor, or both. Thus comparison of workshops and settlements is difficult. Medical results continue to be good, but a standard form of return of the physical condition of all settlers at institutions to which settlements are attached is desirable. There is a tendency for industries in settlements to become similar. Woodwork is popular. Farming is decreasing. Village settlements cater to the few. At Papworth 1,778 cases were admitted in the first ten years, and only 123 patients, or 6.9 per cent, were admitted to the settlement. At Preston Hall, of 620 patients received from 1925 to 1928, 91, or 14.2 per cent, were admitted. The work at Preston Hall is described in further detail. For the three years ending in 1929, the loss was 1.7 per cent on a turnover of 182,192 pounds. The outstanding feature of the work done during the past twelve years is that it has been experimental, and is thus of value, irrespective of the findings.—*Critical Survey. Schemes for the Employment of Tuberculous Patients, J. B. McDougall, Brit. J. Tuberc., April, 1930, xxiv, 79.*—(*R. M. F.*)

After-Care in Tuberculosis.—The diagnosis and treatment of early cases of tuberculosis are delayed by the patients' fear of the effect of a history of tuberculosis upon their economic status. Patients whose term of sanatorium treatment has ended may return to homes which are unsuited for proper aftercare and they again need sanatorium treatment. A memorandum of suggestions as to national development of village settlements for the after-care of tuberculosis is submitted. The capital cost of a village similar to Papworth, excluding the hospital and sanatorium section, is estimated at 100,000 pounds. There 500 persons could be maintained for 1000 pounds per year. Maintenance for the same people outside the village would cost 14,000 pounds a year.

The saving effected would suffice to retire a loan of the necessary capital within 15 years. The capital could be supplied by the Ministry of Health. The local authority could contribute 10 shillings per week per person settled for a period of 15 years, and 1 shilling per week per person settled thereafter. Thus capital and interest would be paid, and provision made for any revenue losses. Another method is to use a contract between the municipality and a national association as a basis for an issue of debentures by the association, which would rank as a trustee security. Patients must be selected who are medically and temperamentally suitable. The medical personnel should receive practical training at a successful village, such as Papworth. Remove fear of economic disaster, assure the patient of immediate treatment, that his family will be cared for while he is receiving treatment, and that one permanently disabled may live in a village with his family, and the tuberculosis problem will be altered. The proportion of sanatorium discharges requiring permanent settlement would, through earlier diagnosis and treatment, decrease from 40 per cent to near 20 per cent.—*Some Observations on the After-Care of Tuberculous Persons, P. C. Varrier-Jones, Lancet, May 24, 1930, ccxviii, 1143.*—(*R. M. F.*)

Village Settlements.—The care of the tuberculous consists more in instruction in a way of life than in issuing medicine. In order to carry out such a scheme, "an environment must be provided in which the following considerations have due weight: the functional power of the damaged organ within the organism must be so protected as to avoid excessive strain, or, indeed, further impairment, and the patient as a whole must be so situated as to avoid opportunities which may impair his power of resistance and recuperation." Since the larger number of sanatorium patients die within five years of discharge and a large majority of these within the first two years, the "after-care" of such people becomes an exceedingly important matter. Numerous schemes have been advocated to care for the promising patient during his postsanatorium period,—none on a sounder basis than that of a colony where work can be graduated and the patient gradually worked back to a productive basis. If this is done with an idea of having the patient learn a new trade which he can do with safety to his physical make-up and with which he can earn a partial or complete livelihood for himself and his family, it offers very great promise. A life of routine and illness away from the family is bad for the patient. The colony meets this issue.—*Village Settlements for Tuberculosis Workers, P. C. Varrier-Jones, J. State Med., June, 1929, xxxvii, 311.*—(*H. S. W.*)

Village Settlements for Tuberculous.—The cost of maintenance and capital expenditure of village settlements conducted on the lines of Preston Hale are discussed. The attempt to create self-supporting communities of tuberculous individuals is described and it compares favorably with other attempts to care for these individuals.—*Economics of Village Settlement for the Tuberculous, J. B. McDougall, Tubercle, May, 1930, xi, 337.*—(*M. E. P.*)

Tuberculosis Hospitals.—The author stresses the fact that sanatoria for mild cases of tuberculosis should be placed in outlying districts and that tuberculosis hospitals for severe cases should be in close association with institutions equipped with surgical apparatus. He is opposed to performing thoracic surgery in sanatoria, as he believes that a surgeon who is at all progressive does not wish to limit himself to tuberculosis surgery or to become a tuberculosis specialist. The bed-capacity of sanatoria should not exceed 300, since the head physician can under these conditions not keep in contact with the individual cases.—*Tuberkulose-Krankenhäuser, K. Henius, Zeitschr. f. Tuberk., 1929, liii, 240.*—(*H. J. C.*)

Sanatorium versus Dispensary Treatment.—Sanatorium results are decidedly better than those of a dispensary. After 6 to 8 years 87.5 per cent were found able to work as against 36.3 per cent of dispensary cases, and 92.6 per cent of the sanatorium cases were still alive in comparison to 49 per cent of the dispensary cases. So far as the prognostically unfavorable cases are concerned the sanatorium possesses no advantages.—*Beitrag zur Frage des praktischen Wertes des Heilstättenkuren bei Lungentuberkulose, C. Kruchen, Zeitschr. f. Tuberk., 1929, liii, 504.*—(*H. J. C.*)

Influence of Weather on Tuberculosis.—It has been shown that the average increase in weight among sanatorium patients in various parts of the world occurs "from August to November from North (Norway) to South (India)." Certain observers have found the increase in weight to occur when humidity was highest. Many of these observations have not been confirmed. Excessive cooling power of the air is associated with some loss of weight. Individual patients vary in their climatic requirements. In general, there is less haemoptysis in brac-

ing atmospheres (more blood in the skin). "A meteorological directory of sanatoria" should aid the physician in choosing the particular sanatorium for the patient under consideration. Meteorological and geological bases for the cure of tuberculosis are important and should receive attention.—*Meteorological and Geological Observations in Relation to Open Air Treatment and Tuberculosis, A. N. Robertson, J. State Med., April, 1930, xxxviii, 233.*—(*H. S. W.*)

Treatment of Tuberculosis at High Altitudes.—High altitudes offer many advantages in the treatment of tuberculosis, but they demand "a certain power of resistance." The early infraclavicular cases do as well in high as in low altitudes, as is also the case with the ordinary early and the moderately advanced cases. Febrile cases may travel to the mountains with impunity unless there be a marked hyperpyrexia. If a patient continues to have fever above 101.5° and a pulse of 120 after several weeks of rest, he should not remain in the higher altitudes. Haemoptysis is not more common in the mountains, and cough and expectoration are lessened. In high altitudes, the contralateral lung in pneumothorax sustains distinctly less strain. People with bronchitis and those with tuberculous laryngitis of moderate degree do well. Those with enteric or genitourinary tuberculosis, weak heart or marked anaemia do not fare well. Return to low levels too early often means return of symptoms.—*Treatment of Pulmonary Tuberculosis at High Altitudes, O. Amrein, J. State Med., May, 1930, xxxviii, 249.*—(*H. S. W.*)

Low Atmospheric Pressure and Tuberculosis.—The effect of diminished atmospheric pressure in high altitudes upon tuberculosis has not been explained. The author submitted 20 guinea pigs periodically to low pressure in a chamber, and used 20 control animals, half of these being infected subcutaneously and the other half intravenously. There was no striking difference between the animals submitted to low pressure and the controls in weight or duration of life. The author notes, however, that even though the diminished atmospheric pressure has no effect upon tuberculosis in increasing resistance it also has no harmful effect.—*Über den Einfluss der Luftdruckerniedrigung auf den Verlauf der Tuberkulose, W. Singer, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 572.*—(*H. J. C.*)

Heliotherapy in Tuberculosis.—In the treatment of orthopaedic tuberculosis, it is always important to recognize the particular form of disease under review as simply a local manifestation of a generalized affection. Local treatment should thus always be carried out along with general treatment. In heliotherapy, in general, it should be the aim to find the definite portion of the spectrum which gives best clinical results (if this be possible) and to treat with that rather than with the whole spectrum. The amount of ultraviolet light in the sun's rays varies greatly, depending upon elevation, geographical conditions, atmospheric conditions, etc. A group of patients were given natural heliotherapy at sea-level (in New Haven) in an atmosphere which approximates "that of the average sea-level manufacturing community." In several instances, exposure to a carbon-arc lamp supplemented the treatment by sunlight. All forms of surgical tuberculosis were treated and all exposures were general, not local, and the incidence of clinical healing was high, particularly in cases with open sinuses. The short ultraviolet rays (below 315 to 320 millimicra) were eliminated. Experimental work was done with infected guinea pigs which were exposed to definite bands of light (between 320 to 400 millimicra). Three treated and three untreated guinea pigs were used, the former living longer and tending to show more fibrosis. When short ultraviolet rays are present, they will produce their specific effects (erythema) which may become so intense as to prevent sufficient duration of exposure for the more effective, longer rays.—*Specificity of Light Action in Tuberculosis, W. M. Phelps, Jour. Bone & Joint Surg., April, 1930, xii, 253.*—(*H. S. W.*)

Uses and Abuses of Ultraviolet Light.—Ultraviolet light is still a mystery, partly because it is invisible. The important feature about light is that it carries energy. The source of energy for every living thing on the earth is the sun, whence it travels in the form of light rays. Some of these are visible, others invisible yet profoundly affect life. The only difference between the two kinds is the frequency with which energy pulsations follow each other in a direct line from the sun. When the time-interval between the pulsations is great we say that light has a long wave-length and low frequency and when the impulses follow each other rapidly we call it a short wave length and high frequency. The speed of light is a constant, 186,000 miles per second. When an impulse of light energy strikes upon the skin of an animal it either (1) bounces off, or is reflected, or (2) it sinks in, or is absorbed. There is a theory which plausibly explains in a broad way why certain substances absorb energy. This is the theory of reso-

nance, which may be illustrated by the old fashioned pendulum as affected by outside forces or vibrations. If the time-intervals of the light waves coincide with a natural frequency of vibration of molecular structure, or some multiple of it, the energy will be smoothly absorbed and protoplasmic activity increased. Energy absorbed must be used somehow and is exhibited in the form of heat, motion, gland activity, nervous activity, etc. It has been proved beyond doubt that certain light rays in the region we call ultraviolet arrive at such a frequency as to cause certain underlying chemical transformations beneficial to health. On this basis there has developed a fad for irradiating the skin. Impatient of cloudy days, man has developed a sort of artificial sunlight and has found that by the use of electricity and devices for making light he can reproduce a light rich in ultraviolet rays. But the light from his therapeutic lamps, whether mercury vapor or carbon arc, does not exactly duplicate sunlight. In certain portions of the spectrum it is stronger, in others weaker. Moreover, now that there are available a number of different sources of artificial ultraviolet illumination, experimentation is becoming more and more widespread and probably more and more irrational. The human body has a natural protective mechanism against sunburn and that is so graded that it builds up protection about as fast as generally needed. Artificial sources of ultraviolet tend to produce sunburn more quickly, although this is less true in the case of carbon-arc lamps. But we have not developed a quick protection against burning from intense ultraviolet light and the result is that the incautious use of lamps will surely produce a burned and painful skin. The eyes are especially sensitive to strong radiation in the ultraviolet zone and when in range of such a source glasses should be worn. The penetration of ultraviolet light into solid material is generally slight. Fused quartz is transparent to most of the rays; certain types of specially prepared glass are more or less so. Ordinary window glass is very opaque to ultraviolet and probably the deepest penetration into the skin under ordinary conditions is 2 mm. for certain light bands at the usual intensity. Chemical activity directly due to the energy received may therefore be expected to take place in the superficial skin layers. Substances produced as a result of this photochemical stimulation may be expected to diffuse into the body fluids, lymph and blood-stream and to be distributed as hormones, possibly being picked up at certain points in a selective manner. It has been indubitably demonstrated that general irradiation of the skin by ultraviolet light tends to prevent or cure rickets, but such a beneficial effect also requires that the diet be adequate, with proper balance and quantity of calcium and phosphorus. It is equally well known that a substance akin to solid alcohol, ergosterol, generally associated with cholesterol in plants and animals, may be regarded in a sense as a precursor of vitamine D. When it is irradiated for a suitable length of time with the proper bands of ultraviolet light of correct intensity, it is subjected to certain chemical changes and becomes vitamine D, which if it be administered to a rachitic animal, causes a favorable therapeutic reaction, provided the mineral elements, calcium and phosphorus, are present. The application of too much ultraviolet irradiation to ergosterol, on the other hand, results in a destruction of vitamine D after its formation. Many authorities agree that subacute rickets may be very widely present among our population, young and old. The catch in the idea of general application of ultraviolet light is that we do not know what is the wisest dosage. Also, to take an ultraviolet bath for such and such a time means little because of the many variables involved, such as distance, amount of electrical energy transformed, type of radiation produced, etc. In general, probably the most satisfactory method of measurement is based on the degree of dermatitis produced. Overexposure in the case of mice has resulted in overgrowth of certain skin cells. Pigment acts as a protection against too much energy absorption but in certain zones of the spectrum it takes place more promptly and adequately than in others. Thus far no artificial source of radiation can be used interchangeably with sunlight. Light therapy is useful in treating certain forms of tuberculosis but there is some uncertainty how much of the benefit is derived from the visible spectrum and how much from the ultraviolet. There is general agreement that the far ultraviolet can be dispensed with and that the near or long wave-length ultraviolet is the therapeutic band. A satisfactory comparison has yet to be made between different bands of ultraviolet of equal intensity. Nor do we know whether a half-time irradiation with double intensity is the equal of a whole time one with half the intensity. Heinrichs, working with small organisms, has demonstrated beyond doubt that, whereas small doses of ultraviolet stimulate, larger ones depress. Rats which have been overirradiated gain less than those receiving the correct dose. That there is a feeling of well-being after one has taken a short exposure to ultraviolet irradiation seems generally true, but how

much this is physiological and how much psychological is uncertain. There is said to exist in some individuals a type of metabolism which results in the presence of definite quantities of haematoporphyrin, which in a fluid medium behaves somewhat similarly to chlorophyl in its ability to absorb radiant energy, and these individuals subjected to irradiation tend to develop itching and painful eruptions. The use of ultraviolet light on patients with advanced pulmonary tuberculosis is deemed harmful, resulting in reactions similar to those following tuberculin injections. There is some effect also on the endocrine glands. In a survey made April, 1929, by a committee of the Medical Society of the County of New York, unfavorable results were reported by 15 pediatrists, 14 orthopaedic surgeons, 15 dermatologists and 14 physical therapeutists and clinicians. This committee concluded that uncontrolled self treatment by laymen was undesirable and it was requested by the Commissioner of Health ot New York City to suggest suitable steps to check indiscriminate application. It would seem that advice on the employment of ultraviolet light to human beings should be restricted to those who have become expert through study and experience. To play with ultraviolet light is to play with a possibly dangerous agency. Careful observations over a considerable period are required and the miscellaneous use of this agency is to be deplored rather than encouraged.—*The Uses and Abuses of Ultra-Violet Light, J. W. M. Bunker, New England J. M., June 26, 1930, ccii, 1229.*—(*A. P.*)

Heliotherapy and Occupational Therapy in Tuberculosis.—Heliotherapy has both a general and specific effect upon the body, affecting particularly the skin and musculature and general morale. Occupational therapy offers to the patient's spirits a material boost and has a threefold value, namely, physical, moral and social, and often it has an economic value also. "Work-cure" is carried on while the patient is in the sun in the bodily position required for his individual disease, so that the patient, for instance with Pott's disease, works in the ventral position; the one with tuberculosis of the hip, in the dorsal position; etc. So successful is this work-cure scheme becoming that plans are under way for the establishment of an "International Factory Clinic" which will comprise principles based on both medical and industrial requirements. —*Heliotherapy and Surgical Tuberculosis in Association with Occupational Therapy, A Rollier, J. State Med., April, 1930, xxxviii, 197.*—(*H. S. W.*)

Heliotherapy in Orthopaedic Tuberculosis.—Twenty-two children were given exposures to a high-amperage carbon lamp up to a maximal dose of 15 minutes on the front and 15 minutes on the back, the maximal period of treatment being five months. There was a noticeable increase in bodily vigor and weight and in the haemoglobin and red count. Nine of the children showed striking clinical improvement. When all the criteria of improvement were considered, such as weight, haemoglobin, red cell count, and general appearance, it was found that 16 were definitely improved, 3 slightly improved, 2 unchanged, and one made worse. X-ray evidence of bony change showed improvement in seventeen. In 7 control children the improvement in the bones was not nearly as marked. Brunettes did better than blondes.—*Carbon-Arc-Light Treatment in Bone and Joint Tuberculosis, Katherine Pardee, Jour. Bone & Joint Surg., April, 1930, xii, 270.*—(*H. S. W.*)

Surgical Treatment of Pulmonary Tuberculosis.—Indications, contraindications and results of phrenic evulsion, thoracoplasty, multiple neurectomy, and extrapleural pneumolysis, as accessory aids or as alternating to artificial pneumothorax, are briefly discussed. The indications for phrenic evulsion are found in patients with basal tuberculosis, basal bronchiectasis, chronic basal effusions with thickened pleura, and generalized tuberculosis when artificial pneumothorax has failed. It is indicated for the relief of symptoms such as pain, cough, and tachycardia; as an accessory to artificial pneumothorax when the base of the lung is adherent; as an aid at the termination of artificial pneumothorax in order to reduce the size of the space; as a preliminary procedure before thoracoplasty; and in the prevention of bronchiectasis in unresolved basal pneumonia. The results of phrenic evulsion are the release of the lung from the strain of the counterdrag of the diaphragm, the partial collapse of the lung by the rise of the dome of the diaphragm and frequently by the paradoxical movement of the diaphragm, and the relief of symptoms such as pain, tachycardia and cough. The indications for thoracoplasty are, in the main, the same as for artificial pneumothorax, and the procedure is usually used when artificial pneumothorax has failed. It is preferred to artificial pneumothorax, however, in cases of advanced, chronic, unilateral, fibrotic lesions with cavitation, and with thickening and dilatation of bronchi and bronchioles. The contraindications are the presence of an active lesion in the contralateral lung, except in cases of haemorrhage, tuberculous en-

teritis, cachexia, cardiac decompensation, persistent albuminuria and diabetes. Multiple intercostal neurectomy is used in certain patients with contraindications to thoracoplasty, but the small series of cases treated in this manner do not warrant any definite conclusion. Extrapleural pneumolysis is indicated in patients needing only partial collapse of the lung, or as an aid to thoracoplasty.—*The Use of Surgery in Pulmonary Tuberculosis, H. M. Davies, Brit. M. J., April 12, 1930, no. 3614, 687.*—(*M. E. P.*)

Surgical Treatment of Pulmonary Tuberculosis.—This article summarizes the newer knowledge of surgery in pulmonary tuberculosis and in tuberculous empyema as propounded at the Thirty-eighth Congress of French Surgeons at Paris in October, 1929. Only about 5 per cent of all cases of lung tuberculosis are suitable for surgery. The aim of collapse therapy is to reduce the lung volume with a corresponding decrease in blood and lymphatic circulation. No collapse can be rendered effective in any case, however, unless the diseased lung possesses some retractility. Thoracoplasty is indicated in fibroulcerative or fibrocaseous, unilateral, quiescent cases in which pneumothorax could not be given or was unsatisfactory. The general condition of the patient must render him a good surgical risk. The contraindications refer to the diseased as well as to the opposite lung. In the former, there must be no active lesions as these signify a poor general resistance, in contrast to old fibrotic cases. It must be carefully determined whether the contralateral lung can stand the added strain. Age or pregnancy is not considered a contraindication. *Phrenicectomy* has a more extensive application. It may be used in patients in whom pneumothorax has failed or thoracoplasty has been found inapplicable. It is suitable in bilateral cases and in febrile cases with poor resistance. Apical as well as basal lesions respond favorably. The resulting decrease in lung volume does not play so important a rôle as the beneficial effects of immobilization of the lung with reduction in circulation and septic absorption. Phrenicectomy may be used to precede a thoracoplasty or to supplement a pneumothorax, an apicolysis or a partial thoracoplasty. Opinions differ as to the selection of anaesthetic for thoracoplasty. Some object to general anaesthesia because of the bronchial irritation and possible loss of the protective cough reflex. A few use only local anaesthesia, while others use general and local anaesthesia. By doing the operation in several stages the incidence of surgical shock is reduced, a proper thoracic equilibrium is maintained and the opposite lung is not overburdened too suddenly. The disadvantage of the several-stage procedure is that in the intervals of stages there occurs an ossification of the periosteum which hinders effective sinking in of the chest-wall. The technique of phrenicectomy is described. To avoid any error Piollet advises pinching of the nonanaesthetized phrenic nerve. This produces a quick homolateral diaphragmatic contraction with hiccough. The results tabulated from various centres of thoracic surgery throughout Europe indicate, after observing the patients for a considerable length of time, that about 50 per cent are favorably influenced, and of these 25 to 35 per cent are classified as cures. The results of phrenicectomy can be evaluated only when it is used as a single procedure. Various surgeons emphasize the frequent unexpected beneficial effects following section of the nerve. The harmlessness of this operation is agreed to by all. *Surgical Treatment of Purulent Pleurisies Complicating Pulmonary Tuberculosis:* The majority of these arise from effusions occurring during the course of pneumothorax. Any radical surgery must be guided by the unilaterality of the lesion and the absence of any severe extrapulmonary tuberculous foci. When tuberculous effusions become purulent, thoracoplasty is the operation of choice. Medical treatment, frequent aspirations, or pleurotomy seldom yield any beneficial results. This protracted form of therapy tends to prevent the lung from ultimate reëxpansion. At Sauerbruch's clinic a lung with a thickened visceral pleura bathed in pus has never been seen to reëxpand. The pleurisy is better treated and a more effective collapse of the diseased lung is simultaneously accomplished by a thoracoplasty. Should the effusion assume the form of a mixed infection of the severe septic type immediate surgery is imperative to avoid the formation of internal or external fistulae. Operation is advisable before the general condition of the patient is such as to render him a poor surgical risk. Some surgeons precede the operation by a pleurotomy while others only aspirate before the thoracoplasty. Lardennois does first the upper stage (the reverse of the procedure in pulmonary lesions) in order to maintain continuous free drainage at the base of the lung during collapse of the chest-wall. The technique is more radical than that used in the treatment of pulmonary lesions, as often anterolateral or parasternal resections are necessary to obliterate a suppurating pleural cavity. The visceral pleura is at times so dense that a pleural symphysis cannot be obtained, and a Schede

pleurothoracectomy is necessary. In these cases the prognosis is very poor. When an internal fistula has occurred, producing an extensive pyopneumothorax with marked constitutional symptoms, immediate thoracoplasty is the operation of choice, if the patient is a good surgical risk. Otherwise external drainage is done to give symptomatic relief and the major operation is performed at some later date. About 50 per cent of these pleural complications are improved as a result of surgery, and 25 per cent of these show very good results. *Conclusions: 1:* Close coöperation between the internist and the surgeon is indispensable. The surgeon should become familiar with the varying resistance of tuberculosis patients to operative procedures. Each case needs long individual study, which is best accomplished in a sanatorium. *2:* In pulmonary lesions, when the operation is indicated, best results are obtained by a two- or three-stage thoracoplasty, preceded by a phrenicectomy. The first rib must be carefully resected. Phrenicectomy has its place because of its innocuousness and the resulting beneficial effects where thoracoplasty is inapplicable. *3:* The recent more widespread use of surgical procedures for tuberculous empyema has completely changed the prognosis in this condition. Further study of the bacteriology and of the virulence of these effusions, and of the methods of application of surgical procedures is necessary.—*Le traitement chirurgical de la tuberculose pulmonaire au 38eCongrès Français de Chirurgie, S. Oberlin, Arch. Méd.-Chir. d. l'Appar. Respir., December, 1929, iv, 499.*—(*J. G.*)

Indications for Surgical Treatment of Pulmonary Tuberculosis.—The indications for artificial pneumothorax are essentially unilateral disease, cavitation, persistent pleurisy, advanced tuberculous laryngitis, and slight intestinal involvement. The contraindications are miliary tuberculosis, extensive bilateral disease, emphysema, asthma, bronchitis, and cardiac and renal disease. Phrenic evulsion is used in cases of unsuccessful pneumothorax; as a preliminary procedure to thoracoplasty; in cases of bilateral involvement which excludes possibility of thoracoplasty; as a supplementary procedure in pneumothorax cases in order to lengthen refill intervals, or to inhibit obliteration of the pleural space, or before reëxpansion of a collapsed lung; in hydro- or pyopneumothorax; in basal lesions and bronchiectasis; as a prophylactic measure in bronchiectasis of unresolved pneumonia; and for the relief of symptoms such as hiccough, vomiting, cough and dyspnoea in advanced tuberculosis. Thoracoplasty is only indicated when all other methods have failed. It should not be recommended to patients past the age of forty-five years and is contraindicated in exudative lesions. It is effective in the treatment of lesions showing fibrosis without an active lesion in the contralateral lung, in cavitation with positive sputum, in tuberculous empyema, and in bronchiectasis and lung abscess.—*Indications for Phrenic Evulsion and Thorocoplasty, P. W. Edwards, Tubercle, June, 1930, xi, 396.*—(*M. E. P.*)

Spirometric Studies in Pulmonary Collapse.—Monolateral pneumothorax produces a diminution in the maximal capacity, vital capacity and residual volume of the chest. The influence of pneumothorax upon the vital capacity cannot be evaluated without further knowledge regarding the residual air. The term, "vital minimal volume," is used to designate the smallest volume that the lung of a living individual can inspire. The diminution of residual volume reveals individual differences and it is dependent upon the vital minimal volume of the lung, the rigidity of the mediastinum, and the changes in the respiratory movement on the collapsed side. The relation between vital capacity and residual air indicates that a diminution of the vital capacity can be influenced also by the factors causing a reduction in the residual volumes.—*Spirographische Untersuchungen bei Lungenkollapse, Anthony and Heine, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 362.*—(*H. J. C.*)

Thoracoplasty and Pregnancy.—In 1922 a posterior thoracoplasty was performed on a 30-year-old woman, and in 1923 the patient was discharged without sputum and healed. In 1927 she gave birth to a healthy child and one and a quarter years later the mother was still in good condition and the child perfectly healthy.—*Thorakoplastik und Geburt. Kurze Mitteilung, F. Jessen, Zeitschr. f. Tuberk., 1929, liii, 214.*—(*H. J. C.*)

New Apparatus for Artificial Pneumothorax.—Locatelli adds to the series of modifications of Forlanini's classical apparatus a model which he thinks unites their various advantages. The following principles are utilized: *1:* To reduce to a minimum the quantity of liquid to be displaced, with the idea of obtaining, or almost, spontaneous aspiration, and at the same time preserving the means of measuring the exact quantity of gas introduced. *2:* To construct a stopcock, easily managed, which will enable the operator to deduce exactly the quantity of gas insufflated and at the same time afford easy and frequent access to the

manometer. *3:* To reduce the volume of the apparatus to a minimum in order to make it readily portable. *4:* Inversion of the receptacles, so that they may charge automatically. There are two of these, each having a capacity of 100 cc. and concentric in shape. The stopcock has five connections. A complete turn insufflates 400 cc.: that is, the two receptacles are twice emptied. At each quarter-turn the manometer is automatically connected and the endopleural reading obtained. The entire apparatus is enclosed in glass and easily sterilized. The manometer is not of the usual U-type, but is also enclosed, like Parodi's ergomanometer, giving a more exact endopleural pressure and information as to the elasticity of the lung and the relation of different respiratory phases.—*Un petit appareil pour le pneumothorax, A. Locatelli, Rev. d. l. Tuberc., June, 1929, x, 380.*—(*A. P.*)

Artificial Pneumothorax.—The indications and technique for inducing artificial pneumothorax are discussed. In a group of patients, sanocrysin treatments were combined with artificial pneumothorax. The results of this combined treatment were not satisfactory.—*Artificial Pneumothorax, J. D Macfie and G. Napier, Brit. M. J., March 8, 1930, no. 3609, 442.*—(*W. I. W.*)

Mechanism of Artificial Pneumothorax.—Artificial pneumothorax is a mechanical treatment, and the Italian school, following the traditions of Forlanini, has rightly had a predilection for its physical effects. Morelli has recently recalled that, in Forlanini's opinion, the primary cause of progression of ulcerative phthisis was the trauma exerted by respiration on a tissue no longer capable of expansion. Parodi, director of the *Sanatorium de Cuasso il Monte* at Tessin in a book opening a series of volumes of Italian tuberculosis literature, has gone into much detail on respiratory physiological mechanism and pneumothorax technique, and Sforza and Morelli have been impressed by the abundance and originality of his ideas. In a chapter on normal respiratory physiology he recalls that the movements of the thoracic cage are governed by the elastic state of the lung. This is subdivided into (1) elasticity of retraction, due to the presence of elastic tissue, and (2) elasticity of distention, represented by inspiratory expansion. The endopleural depression results from the difference between the volume of the lung and the capacity of the pleural cavity, varying with age. The "elasticity of distention" diminishes with the volume of the alveoli peripheral to the hilum. It is easier to immobilize the apex than the base and easier to immobilize infiltrated than healthy parts because their retractile capacity is increased. Because the segments of the lung are independent, a selective collapse is possible. A healthy lobe has a great tendency to expand with inspiration because of the counter-pressure of alveolar air due to interference with expiration by the pressure of the surrounding pneumothorax. Partial retractions of the parenchyma give a festooned appearance to the dome of the diaphragm, even without adhesions. The mediastinum has a very important rôle. In the dog it is very flexible and the lung cannot be collapsed without causing grave disturbances. Even in man, intrapleural changes in pressure are reflected in the opposite pleural cavity. Displacement and lowering of this membrane signifies that the maximum possible collapse has been attained. To produce a selective pneumothorax, one must allow to be aspirated the amount of gas necessary to neutralize structural static elasticity without reducing the functional dynamic depression corresponding to normal inspiratory expansion. The optimum pressure is usually zero or a little below, never above. But ordinarily such selective collapse is more or less spontaneous, and not due to the will of the physician, as Parodi remarks. An effective collapse may necessitate for a time positive pressures. Parodi has devised an apparatus called the ergomanometer, to measure the components of these factors and to evaluate inspiration and expiration separately. It replaces a system of unstable equilibrium by one of stable and, according to Parodi, gives indication of when insufflation should be stopped.—*Sur la physiologie mécanique du pneumothorax, F. Dumarest, Rev. d. l. Tuberc., April, 1929, x, 177.*—(*A. P.*)

Hypotonocity of Diaphragm in Artificial Pneumothorax.—In certain cases of artificial pneumothorax, there occurs a definite hypotonicity of the diaphragm due to the introduction of large quantities of air or to the onset of massive effusions. The loss of tone results in a temporary mechanical paralysis of the diaphragm which is quickly relieved by the removal of the provocative cause. The flattening of the diaphragm which follows the hypotonicity is due to a disturbed mechanical equilibrium, and is undesirable because of the damaging effects it may have upon the neighboring intraäbdominal viscera. By means of an ergomanometer the amount of diaphragmatic tonicity can be estimated and the quantity of air to be introduced so accurately measured that mechanical paralysis is avoided. The paralysis incident to loss of diaphragmatic tone

is in no way comparable to that observed following operations upon the phrenic nerve. In the former the power of contractility is lost with an increase in distensibility. In the latter both are destroyed.—*La ipotonia e la paralisi meccanica del diaframma nel pneumotorace artificiale, M. Mazzetti, Tubercolosi, xxi, May, 1929, 179.*—(*U. E. Z.*)

Pathological Changes under Artificial Pneumothorax.—Collapse therapy is today the most successful active measure employed in treating pulmonary tuberculosis, yet we possess little precise and definite information as to its mode of action. One hears it stated that collapsed lungs heal by "sclerosis," "fibrous cicatrization," or "encapsulation" of tubercles, yet these processes occur spontaneously in certain forms of tuberculosis. The fibrocaseous is the most frequent of the active forms and true "fibroid phthisis," described by Bard, rare under 50. Besides, the cases which benefit most from Forlanini's method are not the fibroid ones; these latter tend always to gradual progression. Studies on the reaction of both parenchymal and connective tissue of the collapsed lung seemed greatly needed. Connective tissue is fundamentally collagenous, yet collagen is not immutable. A further determination of the actual changes in blood and lymphatic circulation seemed also needed, in view of previous conflicting theories and findings. That the healthy parts of the lung are not influenced by pneumothorax has been well demonstrated by Rolland; although he insists there is a relative atelectasis none of his eight illustrations show it. When, however, an exudate occurs in the pleural cavity, such atelectasis is pronounced. A pneumothorax, on the other hand, respects absolutely the healthy parts of the collapsed lung. Tuberculous lungs, however, show three sets of changes: (1) vascular modifications, (2) regressive changes in the air passages, and (3) connective-tissue changes. *Vascular Modifications:* These are considerable and important. Most sections show clearly a proliferative endarteritis, with atrophy of the muscular coat. The adventitia is thickened and, due largely to enormous collagenous bundles, very dense. Capillary neoformations are evident and there is perivascular round-cell infiltration. Such pronounced vascular lesions are rare in the ordinary course of tuberculosis but abundant in syphilitic lesions. The pulmonary arteries, especially their fine lobular ramifications, long remain uninvolved in pulmonary tuberculosis, a fact of great importance. Their elastic armature may be the seat of a hyperplastic process, but they never show ordinarily the enormous production of elastic tissue that goes with pulmonary syphilis. In compressed lungs, however, the vascular pathological changes are pronounced, as shown in microphotographs. *Air Passages:* These exhibit in general a marked atrophy, from the cartilaginous bronchi to the smallest bronchioles. Their epithelium is the site of marked changes, with cellular hyperplasia and mutations. This also contrasts with what occurs in ordinary tuberculous lungs, where there may occur an insular type of sclerous peribronchitis. Here again pneumothorax gives rise to changes suggestive of those of syphilis. Syphilis appears to be a much more active cellular stimulant than tuberculosis. However, the fundamental difference between ordinary tuberculous pulmonary changes and those induced by pneumothorax seems to be in the fundamental connective substance. In the midst of all this, caseation and giant-cell formation may be actively going on. The collagen fragments and a new finely fibrillar substance appear optically homogeneous, taking a yellow tint with Curtis's picric stain. Sometimes it suggests amyloid substance in appearance. It is true, parenthetically, that these studies were made on lungs of patients dying of the disease, not those apparently cured, yet many of them had been on the way toward cure or stabilization. *Effect of Pneumothorax on the Sound Parenchyma of the Collapsed Lung:* This is not affected by compression, a fact long suspected (Forlanini, Brauer and Spengler, Giraud and Reynier, Rolland) and now anatomically confirmed. However, there has been controversy, Kaufmann and Burckhardt presenting some experimental evidence which was severely criticized by Rolland. The present studies show conclusively that normal pulmonary structure is preserved even after sixteen months of pneumothorax. Where, however, a purulent exudate exists in the pleural cavity, conditions are different: the parenchyma is atelectatic and traversed by fibrous bands coming from the thickened pleura. Thus, a bacilliferous purulent pleurisy results not only in a pachypleuritis but in a pulmonary fibrosis and atelectasis. These changes are due to the pleurisy and not the pneumothorax, as thought by Renon and Géraudel, Tecon and Sillig, and others. Rolland rightly insists that fluoroscopic observation of patients under treatment will amply verify the functional capacity of sound pulmonary lobes, which have a normal transparency and present a normal inspiratory expansion. *Effect of Pneumothorax on Nodular Tuberculous Lesions: 1: Circulatory Changes:* The most striking feature in

collapsed tuberculous lungs is the vascular lesions. How is the circulation modified? The idea of hyperaemia was at first uppermost (Sackur, Sauerbruch, Steinbach, Lindblom). Dumarest and Murard opposed this view, and Rolland found the weight of clinical evidence against it as the causative factor of sclerosis. There are, however, an endarteritis and a hyperplastic panarteritis, also a capillary neoformation. Again, there is an analogy with syphilitic lesions. The net result would appear to be ischaemia rather than hyperaemia. *2: Bronchial Changes:* The structure of the air-passages is profoundly altered in collapsed tuberculous lungs. Bronchial atrophy precedes considerably cicatricial sclerosis, but this scleroatrophic tissue always preserves potential epithelial inclusions. *3: Connective-Tissue Changes:* Collagen is not the sole fundamental substance of connective tissue; its mineralization may vary or hyaline transformation may occur. "Involutive degeneration" of connective tissue commonly accompanies the anatomical extinction of tuberculous lesions (Nageotte). *Effect of Pneumothorax on Cavities:* Forlanini, Saugman and Hansen, Burnand, and others,have observed the cicatrization of cavities following approximation of their walls, and Dumarest says there is no other way in which a really considerable cavity can cicatrize. Roubier and Doubrow, however, state that approximation of cavity-walls in the course of pneumothorax is exceptional. Rather do they seem, as Jacquerod says in his book, to undergo a sort of fibrous or fibrohyaline transformation, a scleroatrophic change. During this process they present varied and interesting pictures. *Summary:* Tuberculous pulmonary lesions, under pneumothorax treatment, undergo important modifications. As to the circulation, there is first a panvascularitis, with resultant physiological ischaemia, which profoundly affects all structures and favors scleroatrophic connective-tissue changes. The ultimate destiny of the latter remains a question. What becomes of the collapsed lung? Rist and coworkers have shown that there may be unexpected vital resources in apparently atrophic remnants. If the pneumothorax is complicated by exudate a retractile pachypleuritis occurs, and we may end up with a "fibrothorax." This may also occur, even without preceding exudate. But the most interesting cases are those followed to a clinical cure, with roentgenographic clearing and apparent functional restoration, with almost normal lung fields. (Rist, Jacquerod.) What is the mechanism of this transformation? Does it proceed from epithelial inclusions in a scleroatrophic stroma, a restoration of alveolar elements? Numerous photomicrographs of sections of lung tissue are included in this article.—*Étude histopathologique du mode d'action du pneumothorax artificiel dans la tuberculose pulmonaire, C. Roubier and S. Doubrow, Rev. d. l. Tuberc., August, 1929, x, 463.*—(*A. P.*)

Fever Reactions Following Artificial Pneumothorax.—Kindberg, Amsler and Lenfantin, and Gilbert and others, have recently drawn attention to these. These *réactions de remplissage,* or "refill reactions," although rare are not extremely so. Five observations are cited, occurring on Bernard's service, in considerable detail. The first case was that of a physician of 29 years of age, in whom a pneumothorax was first induced by Mantoux in March, 1919, for a severe ulcerocaseous tuberculosis of the right lung, with excellent immediate results. Fluid appeared in the chest between 1920 and 1922 and became purulent after three punctures, but the course was afebrile. However, about 1925, insufflations began to be poorly tolerated and were discontinued. No adventitious signs were heard on the side where the lungs had been collapsed, and the patient seemed cured until January, 1927, when, after overexertion, the cough, sputum, fever and râles reappeared, subsiding under rest. However, the patient suddenly experienced thoracic pains and dyspnoea, and a slight bilateral swelling of the knee joints. The right base appeared obscure and the heart was markedly displaced to the left. Haemorrhagic fibrinous fluid was withdrawn, affording some relief. In May the symptoms reappeared and 2 or 3 litres of haemorrhagic fluid were removed, in which tubercle bacilli were found. In December, 1927, there was another attack and 1.25 litres were removed. Insufflations were now resumed because of the reappearance of some cough and sputum, about 150 to 250 cc. being given every four weeks, without positive pressure. The pleura was very thick, but the roentgenographs showed a good collapse of the lung except at the apex. About 1928 the patient again began to experience thermic reactions, with chills and sweats, lasting a day and a half, during which he felt weak and uncomfortable, had pain in the chest for two or three days, also increased cough and sputum, with sometimes pain and swelling of the knee joints. His general condition remains good and the left lung sound, and recently his reactions have been less pronounced. Four other cases cited, in women patients, also first showed these thermic reactions at various times after the development of fluid, and sometimes after its disappearance. It is interest-

ing to note that in 2 of the 5 cases it was possible to reinstitute pneumothorax after it had been abandoned. *Summary and Discussion:* Among the points in common was the quite late occurrence of these reactions in the course of treatment and their consequence upon a chronic, sometimes painful, inflammatory condition of the pleura (following exudate). The late occurrence of the febrile reactions (the following day) was also noteworthy. Gilbert attempted to attribute these reactions to a haemoclastic shock related to accelerated resorption through a distended pleura but this scarcely fits the facts. More reasonable is the assumption that we have a transitory irritation of the pleura, supported by the association with a thickened painful pleura and alternation of the reactions when the amounts and pressures are diminished. Pneumothorax treatment should not be prematurely abandoned because of such reactions but it should be administered very delicately.—*Contribution à l'étude des réactions thermiques consécutives aux insufflations de pneumothorax artificial, L. Baron, F. Triboulet and J. Valtis, Section d'études scientifiques de l'Oeuvre de la Tuberculose, February 9, 1929, reported in Rev. d. l. Tuberc., April, 1929, x, 276.*—(*A. P.*)

Nervous Accidents of Artificial Pneumothorax.—During the first insufflation, more rarely at subsequent refills, certain complications of sudden onset and grave nature may occur: for instance, intense distress, circulatory troubles, vomiting, loss of consciousness, amaurosis, convulsions, muscular paresis, and hemiplegia. These may be transitory or persistent and may result in death. Also, death may occur very suddenly without being preceded by the other symptoms. Analogous disturbances have been observed and described in the course of aspiration of pleural exudates, pleural lavage, and surgical intervention for empyema, gangrene and bronchiectasis, and have been attributed by certain authors to reflexes originating in the pleura, and by others to penetration of air into the blood, forming gas embolism. Forlanini and, following him, numerous Italian and French clinicians attribute these manifestations, especially those that are slight or transitory, to "pleural eclampsia," while Brauer and Spengler attribute them exclusively to gas embolism. Wever carried out numerous experiments on dogs and monkeys in which he was able to produce analogous symptoms by introducing air into the carotid artery, and Stargardt examined the animals ophthalmoscopically, finding circulatory anomalies in their eye-grounds. After a few seconds the small retinal arteries filled with air and the capillaries contracted while the nerve-head became blanched. Especially in the macula, little silvery bubbles appeared; a little later the veins dilated and the bubbles began to disappear. After about four minutes the circulation resumed its normal appearance. Histological sections of the brains were also made and carefully examined by Spielmeyer, who determined that fifteen hours after the embolism occurred a liquefaction of the cytoplasm of the cortical cells and degeneration of the fibres around the ganglion cells began, with the eventual formation of a hard shell around these cells. About the third to fifth day the neuroglia reaction began, ending toward the twelfth day by replacing the altered nerve cells. Spielmeyer and Wever asserted that the negative results of histological studies previously made were due to defective technique of staining. If organic alterations have not been found more frequently at necropsy, it might readily be due to the fact that less than fifteen hours had elapsed after the embolism, an insufficient time for the creation of the conditions necessary for finding pathological lesions in the affected cerebral tissue. Thus, among the 7 cases of Saugman and 8 of Sundberg, only one, necropsied thirty-six hours after the morbid symptoms appeared, showed definite organic alterations in the brain. On the other hand, neither the failure to find a perforated vessel nor the absence of cerebral lesions is sufficient to exclude embolism or a "pleural eclampsia." Certain authors, such as Dumarest, Murard, and Bezançon, believe both causes may produce nervous accidents and Cordier's animal experiments lend some support (although more recently Croizier has repeated them and been unable to substantiate his findings). Parisot and Morin suppose that a sudden and intense traction on pleural adhesions may provoke death, but the fact that adhesions are often stretched and even rupture without any such symptoms is opposed to such a view. Two cases of nervous accidents are cited. In the first the manifestations appeared at the seventh refill and are believed to have undoubtedly been due to embolism, the conditions for its production being favorable. The pathological process extended to the lung surface, a cavity being covered by the visceral pleura, which had been rendered thick, sclerotic and adherent in such a way as to leave only a partial space or encysted pneumothorax. It is believed that the point of the needle impinged against the lung, possibly during a deep inspiration and perforated a vessel in the infiltrated nonelastic tissue. The symptoms were psychic, such as obscurement of conscious-

ness followed by anxiety, and then unconsciousness followed by amnesia; and motor, —paresis of extremities, diplopia, intermittent clonic contractions finally assuming the form of Jacksonian epilepsy. These symptoms retrogressed after a few hours to appear more intensely a few hours later. Wever noted a similar intermittence in his animal experiments. This may be attributed to intermittent obliteration of the cerebral capillaries. The second case reported is not attributed to gas embolism, partly because the symptoms were delayed in their appearance about twenty minutes, until the patient changed her position, and partly because the manometric readings were such as to indicate a free pleural cavity. It is admitted that the aspiration of gas from the pneumothorax cavity following rupture of avascular adhesions is a possibility. The laryngeal spasm, vomiting, and muscular contractions, with sudden fall in temperature, seem more likely to be attributable to pleural eclampsia, set up by the sudden increase of intrapleural pressure in a sensitive patient on sitting up. Theoretically, ischaemic spasm of the cerebral vessels, occurring reflexly, might produce cellular changes and consequent symptoms. Practically, this does not seem to fit most cases. *Discussion and Summary:* While the possibility of nervous accidents of reflex pleural origin should be admitted, most of these cases are undoubtedly due to gas embolism. If needle puncture can set up a pronounced reflex with grave sequellae, these ought to be of more frequent occurrence. On the other hand, certain combinations of conditions predispose to the danger of embolism. If the needle point penetrates infiltrated, sclerosed and inelastic tissue, the vessel pierced may have the orifice held open by adhesions to surrounding tissues and thus aspirate either alveolar or pneumothorax air. This view, originally held by Brauer, was also supported by Saugman, Giesemann, Gutstein and others. A pulmonary vein, in which there is negative pressure, may also be directly punctured and air aspirated from the tubing. Even with the needle in the pleural cavity embolism may occur, if the needle point happens to pierce a superficial vein in the infiltrated lung at some stage of the procedure, which may after withdrawal aspirate air from the pneumothorax, especially if the latter is under positive pressure (Zink). It is reiterated that it is entrance of air into pulmonary, not systemic, veins which leads to the danger of cerebral embolism. *Conclusions: 1:* The pathogenesis of the nervous accidents occurring in the course of artificial pneumothorax relates principally to gas embolism, and in a very limited number to pleural reflex. *2:* With certain precautions the chance of an embolus occurring may be reduced. *3:* Chloral has a most favorable influence on the convulsions and spasms which ensue. *4:* The extreme rarity of these accidents does not warrant ignoring their possible eventuality.—*Les complications nerveuses subites au cours du pneumothorax artificiel, N. B. Rekonomopoulo and B. Papanikolaou, Rev. d. l. Tuberc., April, 1929, x, 222.*—(*A. P.*)

Gas Embolism during Artificial Pneumothorax.—A patient, aged 19, developed a flaccid monoplegia of the right arm following the introduction of the needle for a pneumothorax refill. The patient lost consciousness for about fifteen minutes. Upon recovery the paralysis had completely disappeared. The author believes that the needle punctured the lung because of the incompleteness of the collapse due to the presence of adhesions.—*Eclampsia pleurica od embolia gassosa in corso di pneumotorace artificiale, B. Sardo, Tubercolosi, xxi, July, 1929, 296.*—(*U. E. Z.*)

Surgical Treatment of Adhesions in Artificial Pneumothorax.—Gravesen and Matson have independently noted that in artificial pneumothorax cure was obtained in 37 per cent fewer cases with adhesions than in cases with complete collapse. Many attempts have been made to deal with them. Jacobaeus, in 1910, contributed the procedure of examining the chest with a thoracoscope and of introducing a galvanocautery with which the adhesion is severed. With this method 66 per cent of the cases show improvement, but Jacobaeus and Unvericht report complicating empyema in 10 per cent and tuberculous exudate in 15 per cent. Empyema from external microörganisms may be guarded against by careful technique. Endogenous empyemata present a greater hazard, and here the nature of the adhesions is important. They may be classified according to their shape as this gives a definite indication of their structure. *Types: 1:* Adhesions of which neither the pulmonary nor the thoracic insertion is broadened out. They are elastic and stretch almost without limit. Division is not dangerous, but the effect is more or less illusory. *2:* Adhesions of which the thoracic end is broadened out. These are older, their elasticity is limited, and their division gives better results. They are, however, rare. *3:* Adhesions of which the pulmonary end is conical. Such are usually very dense and contain lung tissue. They are frequently met with, and it is the severing of this type of adhesions which causes the majority of

empyemata. If no complications occur, however, the best therapeutic results are secured in this group. *4:* Adhesions in which the two insertions are broadened and in which the midportion is fibrotic. Here the danger of infection is less than in *3* and the group is an important one. In view of the hazards involved in severing adhesions, even though this be done near the chest-wall, it is proposed that all adhesions except *1* should be enucleated from the chest-wall. With the galvanocautery this is dangerous, especially because of the risk of haemorrhage from an intercostal vessel. *Author's Technique:* Following exploration with a Saugman needle, through which a fine wire is pushed to show the depth of the intrapleural space, a thoracoscope is introduced and the nature of the adhesions present is determined. A point of entry for the cautery is chosen which allows working at right angles to the adhesion. By means of a long needle both the adhesion and the parietal pleura are anaesthetized with 0.4 per cent novocaine. One cautery loop is made to serve as a diathermy electrode and as the galvanocautery. A coagulation zone, 2–3 mm. wide, is produced by diathermy and the cauterization is kept within this limit. In large adhesions the two procedures are used alternately, the whole field of operation being kept close to the chest-wall. Blood-vessels are coagulated and haemorrhage is avoided. The use of two instruments with two punctures has advantages in that the cautery can be manipulated independently of the thoracoscope. Jacobaeus and others, having tried the one-puncture procedures, have reverted to using two-puncture sites. Of 130 cases operated on, one developed empyema, and one a tuberculous exudate. No patient died.—*Surgical Treatment of Adhesions Interfering with Artificial Pneumothorax, G. Maurer, Lancet, July 12, 1930, ccxix, 72.*—(*R. D.*)

Thoracoscopy and Internal Pneumolysis.—An instrument is used which serves both as a thoracoscope and as the cannula for the cautery. As one puncture only is made, the choice of the site is most important; the horizontal position may be determined from the roentgenogram, but the anteroposterior plane is best determined by rotating the patient before the fluoroscope, when the adhesion appears to shorten as the thoracic end is brought near the screen. It is unsafe to insert the thoracoscope closer than one inch from the sternum or the border of the spine. Local anaesthesia is secured by 2 per cent novocain, and an effort is made to block the nerves posterior to the insertion of the adhesion. The actual severing of the adhesion is accomplished by using a coagulating current and then cutting through the coagulated portion with a galvanocautery. Specific directions are given as to the operation of a machine of the type used by the author.—*Thoracoscopy and Internal Pneumolysis, F. G. Chandler, Lancet, July 12, 1930, ccxix, 74.*—(*R. D.*)

New Cannula for Thoracoscopy.—The author describes a new cannula for direct thoracoscopy in which the source of light is a pear-shaped electric bulb introduced through a thin flexible metal shaft. In order to protect the operator against reflected light there is a small reflector on the light. The new instrument is a combination of the thoracoscopes of Singer and Kremer.—*Eine neue Kanüle für direkte Thorakoscopy, W. Mascher, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 382.*—(*H. J. C.*)

Artificial Pneumothorax in Pulmonary Tuberculosis Complicated by Emphysema.—Most authorities are agreed that pulmonary emphysema is a strict contraindication for the use of artificial pneumothorax. The usual relations between tuberculosis and chronic vesicular emphysema may be grouped as follows: *1:* In essential emphysema, usually the entire lung is involved, more so in the lower parts; a coexisting tuberculous focus is usually fibrous and benign. *2:* In some chronic forms of pulmonary tuberculosis (*tuberculosis fibrosa diffusa* and *peribronchitis tuberculosa*, according to W. Neumann), emphysema may develop as a compensating mechanism. *3:* In disseminated fibrous and fibrocavernous processes of the upper lobes, emphysema may develop in the lower parts of the lungs. Unilateral lesions, complicated by emphysema, may be treated by pneumothorax only if the thoracic cage is not too stiff, when asthma and bronchitis are absent, and when cardiac function is unimpaired. Further contraindications are hypertrophy of the right ventricle, arteriosclerosis, and hypertension. A number of case reports are briefly presented. It is observed in these patients that a good collapse can usually not be obtained, even in the absence of adhesions, because the pulmonary parenchyma is stiffened. The elastic relaxation is, however, enough to produce good therapeutic results. The intrapleural pressure is but little changed by the introduction of air. Out of 8 patients treated, three were discharged able to work and with negative sputum, two were improved, two remained unimproved, because adhesions prevented collapse, and one became worse after an extensive subcutaneous emphysema.—*Pneu-*

mothorax-Behandlung bei emphysematösen Phthisikern, H. Schipper, Wien. klin. Wchnschr., March 13, 1930, xliii, 327.—(M. P.)

Bilateral Artificial Pneumothorax.—The author reports 16 cases of bilateral artificial pneumothorax. Seven resulted favorably. One case died of embolism. Cases unsuited for bilateral pneumothorax were those with cardiac embarrassment, disturbances of the circulatory system, severe and moderate metabolic disturbances, Basedow's disease, and those with acute progressive infectious diseases. The treatment is preceded by a camphor therapy, and after 2½ to 3½ weeks the pneumothorax is instituted on the severe side, followed shortly by pneumothorax on the less involved side.—*Zur Kasuistik des Pneumothorax bilateralis. Vorl. Mitt., W. Boehm and M. Puhr, Zeitschr. f. Tuberk., 1929, liii, 307.—(H. J. C.)*

Bilateral Artificial Pneumothorax.—The author reports 16 cases of bilateral artificial pneumothorax. Six were given a second pneumothorax after the existence of a primary pneumothorax for some time, and four of these resulted favorably. In 10 cases bilateral pneumothorax was instituted coincidently: in 2 there was no result, 4 showed improvement, one was favorable and 3 were questionable. The authors believe that by proceeding carefully complications can be avoided and favorable results obtained.—*Die Behandlung der Lungentuberkulose mit doppelseitigen Pneumothorax, L. Dünner and S. Spiro, Zeitschr. f. Tuberk., 1929, liii, 431.—(H. J. C.)*

Oleothorax.—Massive intrapleural injections of gomenol oil can be used for its disinfecting action in purulent pleurisy and chronic bacillary serous effusions; for its indirect detoxicating action by rendering the pleural layers thick and impermeable and inhibiting absorption of bacillary toxins; and for its mechanical action in promoting and maintaining a sufficient collapse of the lung in artificial pneumothorax. In pleuropulmonary perforation the gomenol relieves the immediate distress and may help to combat complications following perforation. It may be used to oppose progressive formation of pleural adhesions in pleurisy accompanying pneumothorax, and to combat hernia and displacement of the mediastinum, by increasing the rigidity of the pleura. It should not be used as a substitute for artificial pneumothorax, for the maintaining of an oleothorax is more difficult than that of a pneumothorax. It may cause febrile reactions which are insignificant except as an indication of the degree of pleural susceptibility, and they become important only when accompanied by pleural effusions. If the effusion occurs after the pneumothorax cavity is blocked by the oil, the increased pressure may cause mediastinal displacement or perforation. These accidents may be avoided by removal of some of the oil before too great positive pressure is reached. The objection, that the oil thickens the pleura and hinders subsequent reëxpansion of the lung, is lessened by the fact that the pathological processes against which this mode of treatment is directed produce the same effect. Also the irritating chemical action of gomenol is transitory. The liquid used may be sterile olive oil or liquid paraffine, with gomenol added in the dilution of two to ten per cent, according to the degree of antiseptic action desired. Intolerance is observed by the preliminary injection of 2 to 5 cc. of oil. If there is no intolerance, 100 to 500 cc. may be given at one time. In purulent effusions, the fluid must be withdrawn before the instillation of the gomenol.—*Oleothorax, M. Gilbert, Tubercle, June, 1930, xi, 385.—(M. E. P.)*

Oleothorax.—In 1922 Bernou introduced a new method of collapse therapy, consisting of injections into the pleural cavity of quantities of olive oil or paraffine in sufficient amounts to collapse the lung more efficiently than pneumothorax. It was also intended to promote a rapid sclerosing process which would fix the mediastinum and render the applications of higher pressures safer. It was used as a prophylactic against the simple effusions and as an antiseptic in those secondarily infected. It was also indicated in the treatment of empyema and pulmonary fistula. Because of the technical difficulties, oleothorax has been largely discarded. The author has made an exhaustive study of the technical aspects of the procedure and has evolved a new apparatus with which he is able to perform the operation without risk or danger to the patient.—*Nuovi principii di tecnica per l'oleotorace. Nuovo apparecchio, Felice Parodi, Tubercolosi, xxi, June, 1929, 219.—(U. E. Z.)*

Indications for Oleothorax.—Küss's original report on this method has been followed by interesting studies by Bernou, Courcoux, Tobé, Coulaud, and Raphael and Fontaine. Bernou recommends a metallic oleomanometer of the aneroid type as preferable to the usual vertical tube communicating with air. Dumarest's experiences do not confirm the views of Bernou and Küss

as to oleothorax being the treatment of choice in the pleurisies of pneumothorax. *1:* Simple pleurisies, probably due to infection by the lymphatic route, which, after a febrile secretory phase of two weeks to three months become cold abscesses, then little by little stabilize and resorb. Here it does not seem wise to risk the inflammatory effects of oily injections, with their constitutional reactions. Also, too many punctures predispose to external fistulization. *2:* Malignant pleurisies, characterized by immediate and persistent hyperthermia and probably due to massive mixed inoculation from the lung. Here time should not be wasted in false manoeuvres. Repeated pleural lavage at weekly intervals is preferable to oleothorax. If this fails, a small external drainage, followed later by thoracoplasty, is the best procedure. *3:* Pleuropulmonary perforation, presenting a similar clinical picture to the foregoing. Here, however, oleothorax is more dangerous because of the fistula and may cause inundation of the opposite lung. The treatment mentioned for septic pleurisy should be used here. If the fistula does not close spontaneously, surgery is demanded. Summarizing, Dumarest considers only mechanical factors as indications for oleothorax: that is, to improve or maintain pulmonary collapse. In acute septic pleurisies it is dangerous or ineffective and in simple pleurisies is of doubtful advantage—*Sur les indications de l'oléothorax, F. Dumarest, Section d'études scientifiques de l'Oeuvre de la Tuberculose, April 13, 1929, reported in Rev. d. l. Tuberc., June, 1929, x, 420.*—(*A. P.*)

Phrenicectomy.—Bérard and Guilleminet report on a personal experience with 245 cases. The technique is simple and harmless. A paralysis of the corresponding hemidiaphragm occurs, which may rise from 2 to 8 cm. or more and become immobile or only subject to slight passive movement. The lung volume is reduced 20 to 25 per cent and put at rest. Phrenicectomy may be employed, especially in unilateral severe ulcerative lesions, inactive or localized. Less favorable, though appreciable, are its effects in acute forms of bilateral disease predominating on one side. It is also well combined with thoracoplasty. In 96 patients it was the only procedure. In these, excellent results accrued in 34 per cent, and three-fourths of the successes were in right-sided cases. The site of the lesions has no bearing and even pleural symphysis is not a contraindication. Large cavities of the apex and middle lung are often extraordinarily influenced. Judiciously employed the procedure is of great service, although it is impossible to foretell in individual cases its exact effects.—*Indications et résultats de la phrénicectomie dans le traitement de la tuberculose pulmonaire, Bérard and Guilleminet, Meeting Académie de Médecine, June 18, 1929, reported in Prog. Méd., July 13, 1929, xxviii, 1212.*—(*A. P.*)

Gastrocardiac Syndrome after Phrenic Exairesis.—This symptom-complex is rarely observed but is recorded by the author in a 12-year-old girl in whom a left-sided phrenic exairesis was performed on account of bronchiectasis, and with good results. Five months after the operation there occurred dyspnoea and cardiac palpitation following a heavy evening meal. The pulse was increased to 200. The symptoms were alleviated by the erect posture and walking, and further attacks prevented by giving a light evening meal and not permitting the patient to go to bed until two hours later. The cardiac findings were normal and there was no shift to the left. The electrocardiogram also showed no definite changes.—*Gastrokardialer Symptomenkomplex nach Phrenicusexhairese bei einen zwölfjährigen Kinde, F. Bernuth, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 255.*—(*H. J. C.*)

Pneumonia after Phrenic Exairesis.—Following the institution of phrenic exairesis, as in artificial pneumothorax, there occur a certain number of pyrexias and a smaller percentage of cases developing a stormy picture with pneumonic reaction. Among 350 cases of phrenic exairesis there were 5 with the latter type of reaction. In 3 of these all the classical symptoms of pneumonia were present. In one there was a reaction, with the development of a small cavity which shortly diminished in size, and in another all the clinical symptoms of pneumonia, with a fever extending over weeks and disappearing after thoracoplasty. The author believes all these pneumonic complications following exairesis to be nonspecific pneumonias resulting from trauma of the pleura or lung occasioned by the exairesis. These pneumonias can either completely retrogress or be the basis of a subsequent tuberculous spread by aspiration.—*Uber das Auftreten von Pneumonien nach Phrenicusexhairese, M. Loewenthal, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 712.*—(*H. J. C.*)

Treatment of Tuberculous Pleurisy by Pleurotomy.—Pleurotomy in tuberculous serofibrinous pleurisies is recommended by the author as being analogous to treating tuberculous peritonitis by laparotomy. The operative technique is described, and in

after-care the patient lies on the operated side. Six cases were reported with favorable results and return to work. The method is not advised in cachexia, poor cardiac condition, widespread pulmonary tuberculosis, coincident tuberculous peritonitis and bilateral pleurisy.—*Über Dauerresultate bei der Behandlung der chronischen serfibrinösen tuberkulösen Pleuritis durch Pleurotomie, E. Fischensohn, Arch. f. klin. Chir., 1929, clix, 568.*—(*H. J. C.*)

Temporary Rib Resection.—A modification is suggested for intrathoracic manipulations, which is based on the methods of O'Brien and Krampf. A piece of one rib is freed from its periosteum, with the exception of its lower circumference. Then, the bone is resected and turned downward, preserving its connections with the soft tissues in the intercostal space. The incision is made through the costal periosteum and after this incision is sutured, the resected fragment of the rib is replaced and sutured at its anterior and posterior poles. With this procedure, the postoperative pain is markedly reduced.—*Zur Operationstechnik der Lungenplombe (temporäre Rippenumklappung), H. Maendl and E. Schwarzmann, Wien. klin. Wchnschr., November 28, 1929, xlii, 1537.*—(*M. P.*)

Treatment of Pulmonary Tuberculosis with Living Avirulent Tubercle Bacilli.—The author reports clinical experiences with the Arima "saponin bacilli," that is, tubercle bacilli made avirulent and low in fats and waxes by being grown on a sponin medium. The bacteria were apathogenic for guinea pigs and were used in 9 cases of pulmonary tuberculosis. In evaluating the cases the author considered the general clinical well-being as determined by weight, appetite, etc., the roentgenogram, the haemogram and the sedimentation reaction. As a whole the impression with this treatment was favorable in that a good influence upon the disease process was noted in 7 of the cases. The harmlessness of this reagent was verified and it is recommended that it be used on a larger series of cases.—*Beitrag zur Behandlung der Lungentuberkulose mit ihrer Fetthülle beraubten lebenden avirulenten Tuberkelbacillen. ("A. O." Arima, Osaka), R. Gewaltig, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 753.*—(*H. J. C.*)

Treatment of Pulmonary Tuberculosis with Lipomykol.—The percutaneous administration of "Lipomykol," consisting of a complex mixture of complicated waxes, fats and lipoids, and free from protein, affects the reticuloendothelial system of the skin which is important in fat metabolism and in fat antibody-formation. Phagocytosis is stimulated by the reticuloendothelial system, as the result of which tuberculotoxins in the blood are rapidly made harmless. Subcutaneous injection of Lipomykol can lead to general and focal reactions. Careful dosage obviates these. The author reports upon 29 cases of pulmonary tuberculosis in which a favorable influence upon the disease process was noted.—*Ein Beitrag zur Behandlung der Lungentuberkulose durch percutane Einverleibung unspezifischer Fettstoffe (Lipomykol), R. Gewaltig, Zeitschr. f. Tuberk., 1929, liv, 32.*—(*H. J. C.*)

Treatment of Pulmonary Tuberculosis with Lipatren.—Parenteral lipatren therapy is not entirely harmless. Under it a closed case of pulmonary tuberculosis with normal temperature changed into an exudative form, positive for tubercle bacilli. For this method the patient must be afebrile and the leucocyte count cannot be diminished more than 10 per cent. In spite of careful dosage lipatren is poorly tolerated by some patients. General reactions are to be avoided, while focal reactions may be desirable. The blood picture is serviceable as a control, since, when the action is favorable, the lymphocytes increase while the monocytes decrease. As a whole the results are not better than those obtained with climatic and other types of general treatment.—*Parenterale Lipatrentherapie bei der Lungentuberkulose, Becker, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 190.*—(*H. J. C.*)

Incorrect Statistics on Friedmann's Vaccine.—Szalai, the leader of the tuberculosis dispensary in Pesterzsébet, Hungary, has for several years treated all his patients with Friedmann's vaccine. In several publications, he claimed unusually good therapeutic results. He supported his claims by statistics, which were supposed to show that the tuberculosis mortality in his community, a suburb of Budapest, declined more rapidly than in other communities during the last eight years in which he administered his treatment. This paper points out that his statistics are faulty to the extent as to vitiate his conclusions; properly analyzed, his figures would indicate rather that his community shows a smaller decrease of tuberculosis mortality than comparable communities.—*Die Tuberkulosestatistik von Pesterzsébet, K. Freudenberg, Klin. Wchnschr., March 22, 1930, ix, 529.*—(*M. P.*)

Treatment of Tuberculosis with Residual Antigen.—In the July, 1928, issue of the *British Journal of Tuberculosis*, the

preparation of this antigen used in the treatment of tuberculosis, and the immediate results obtained in 67 patients, were described. The present note deals with the after-history of these patients. The only requirement for treatment was a positive diagnosis of tuberculosis. The results show that a patient who responds unfavorably during and immediately after antigen therapy has a poor prognosis, whereas those who improve immediately after the treatment have a much better chance of ultimate survival. The most spectacular results were obtained in adults with tuberculous enteritis but with no clinical evidence of pulmonary involvement.—*Subsequent History of Patients Treated with a Residual Antigen of B. Tuberculosis, C. E. Jenkins, Brit. M. J., August 30, 1930, no. 3634, 318.*—(*M. E. P.*)

Treatment with Tuberculin and Artificial Pneumothorax.—Pneumothorax treatment should be supplemented by tuberculin therapy. The percentage of pleural exudates in tuberculin-treated pneumothorax patients is considerably smaller than in patients who do not receive tuberculin. After an effusion is formed its resorption is greatly hastened by tuberculin treatment. In Neumann's clinic every patient under pneumothorax therapy receives tuberculin. This form of treatment is particularly necessary in those types of tuberculosis which, according to Neumann, are propagated by the bloodstream, and in which, therefore, the pulmonary lesion is only a part of the disease—*Künstlicher Pneumothorax und Tuberkulin, H. Mayrhofer, Wien. klin. Wchnschr., July 17, 1930, xliii, 903.*—(*M. P.*)

Tuberculin in Treatment of Eye Disease.—Nine patients with conjunctivitis, iritis, iridocyclitis or retinitis of obscure aetiology were treated with tuberculin after each patient had responded positively to a Pirquet test. The details of treatment in each case are not described, but care was taken to prevent severe reactions to the tuberculin. Each inflammatory lesion had not previously benefited by ordinary method of treatment. Marked improvement or arrest of the lesion was produced in each case.—*Treatment of Eye Disease by Tuberculin, W. C. Wilkinson, Brit. M. J., June 14, 1930, no. 3623, 1090.*—(*M. E. P.*)

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